CHAPTER TEST: INTRODUCTION TO EUCLID'S GEOMETRY
Mathematics | Class IX (2026/EUCLID/09/LongAns/002)
Time: 1 Hour **Max. Marks: 25**

LONG ANSWER QUESTIONS: EUCLID'S GEOMETRY
SET – 2 (The Fifth Postulate and its Equivalents)

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1. State Euclid's Fifth Postulate. Illustrate it with a diagram showing two lines being intersected by a transversal where the interior angles sum to less than 180°.

2. What is Playfair's Axiom? Explain how it is an equivalent version of Euclid's Fifth Postulate. Why did mathematicians try to prove the Fifth Postulate using the first four?

3. Prove that two distinct intersecting lines cannot be parallel to the same line. Use a logical argument based on Playfair's Axiom.

4. Consider two "postulates":

   (i) Given any two distinct points A and B, there exists a third point C which is in between A and B.

   (ii) There exist at least three points that are not on the same line.

   Do these postulates contain any undefined terms? Are they consistent? Do they follow from Euclid's postulates? Explain.

5. Explain the concept of "Consistency" in a system of axioms. If a new postulate were added that contradicted an existing axiom, what would happen to the mathematical system? Use the Fifth Postulate's history as an example.